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BARK BEETLE ACTIVITY IN A PONDEROSA PINE STAND
THINNED WITH CACODYLIC ACID

By

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SUMMARY

Results of a survey on the Wenatchee National Forest show a young second-growth ponderosa pine stand thinned with cacodylic acid attracts a population of secondary bark beetles and various wood borers, similar in composition to a stand thinned with a saw. Ips pini (Say) was the most prevalent bark beetle found. Several of the leave trees were also attacked during the immigration of the beetles into the area. Despite these attacks the stand remains fully stocked.

INTRODUCTION

A cooperative study between the Washington State Health Department's Community Pesticide Study Project, Wenatchee, Washington, and the U.S. Forest Service was begun in 1968 to determine potential health hazards in using cacodylic acid ^{1/} for thinning overstocked second-growth ponderosa pine stands. As a part of this study, Insect and Disease Control Branch personnel observed and reported on bark beetle activity in the chemically thinned stands.

Distribution:

Karel Stoszek, Weyerhaeuser
Ken Wright, PNW
Boyd Wickman, PNW
BLM, Portland (10)
OSDF (10)
WSDNR (10)

^{1/} The material used was Silvisar 510 made by Ansul Co., Marinette, Wisc., containing the equivalent of 5.7 lb. cacodylic acid/gal.

BACKGROUND

The study area is located about 10 miles north of Entiat, Washington, along the Mud Creek Road (T.27N., R.20E., sec. 24, see attached map). The area was divided into three units. The first unit of 27 acres was treated during May-June 1968, the second unit of 31 acres was treated during August-September 1968, and the third unit of 42 acres was treated during November-December 1968. The stand is on a south slope that has been logged periodically since early 1900's. The site is a low IV. The stocking varied from 1,000 to less than 20 trees per acre. The age of the second-growth trees varied between 60-100 years-old.

The silvicide was injected into the trees at the prescribed rate of 2 ml. per 2 inches of diameter. Various tools and methods were used for injecting the chemical.

There was no bark beetle activity in the stand when the study started in 1968. The nearest known infestation was about 3 miles away where small groups of ponderosa pine were being attacked by the mountain pine beetle.

SURVEY METHOD

The survey data were collected from a series of quarter-chain-wide strips, 2 chains apart. All trees within the strip were inspected for bark beetle and wood borer activity. Only the infested trees were tallied. They were recorded either as treated or nontreated (leave trees) with cacodylic acid. The bark beetles were identified by species but the wood borers were grouped together.

Detection of infested trees was primarily based upon the evidence of entrance and emergence holes and removing a portion of the bark to look at the egg galleries. No attempt was made to determine if cacodylic acid had an insecticidal effect upon brood survival since the broods, if any, had already emerged before the survey was made.

The data was analyzed to estimate the number of infested trees in the area and determine the coefficient of variance for each.

RESULTS

Trees treated with cacodylic acid do attract various bark beetles and wood borers. During this migration of beetles into the area, some of the leave trees are also attacked (Table 1).

Table 1.--Summary of insect infested trees sampled in a chemically thinned stand

	:	UNIT			:	
Insect	:	1	:	2	:	3
Infested	:	Date of Treatment				Total
Trees	:	May-Jun	:	Aug-Sept	:	Nov-Dec
		- - - <u>Number</u> - - -			<u>Number</u>	<u>Percent</u>
Acid treated trees		275		248	444	967 97.6
Leave trees		9		5	10	24 2.4
Total		284		253	454	991 100.0

Majority of the beetles found in the area were the secondary bark beetles and not the more aggressive mountain pine beetle and western pine beetle (Table 2). The most prevalent secondary bark beetle found in the acid-treated trees and leave trees was the pine engraver, Ips pini (Say). A portion of the trees (20 percent or 189 trees) infested with ips had also been attacked by the red turpentine beetle and various wood borers.

Table 2.--Summary of bark beetle activity in acid-treated and non-treated leave trees

Insect Species	: Infested leave trees :			:Total:	: Infested treated trees :			Total	
	UNITS				UNITS				
	1	2	3		1	2	3		
	- - - <u>Number</u> - - -				- - - <u>Number</u> - - -			<u>No.</u>	<u>%</u>
Mountain pine beetle	0	0	0	0	1	0	1	2	<u>3/</u>
Western pine beetle	0	0	0	0	3	0	0	3	<u>3/</u>
Ips complex <u>1/</u>	4	0	1	5	196	213	343	752	78
Red turpentine	5	5	9	19	43	15	46	104	11
Wood borers <u>2/</u>	0	0	0	0	32	20	37	89	9
Douglas-fir engraver	0	0	0	0	0	0	17	17	2
Total	9	5	10	24	275	248	444	967	100

1/ Included are 189 trees (20 percent) that also had red turpentine beetle and various wood borers present.

2/ Includes various species of flatheaded borers and roundheaded borers.

3/ Less than 1% of the infested trees.

Analysis of the survey data indicated 147 to 315 leave trees were infested on 100 acres (Table 3). The estimated total number of infested treated trees is 10,000 to 15,100. The coefficients of variance are 36 percent and 20 percent, respectively.

Table 3.--Summary, analysis of variance of insect infested trees in a stand treated with cacodylic acid

Infested tree clas- sification	: Acres : treated	: Acres : surveyed	: Sample : infested : trees	: Infested : trees/ac	: Estimated : trees/ac	: Coef- : ficient : variance
			- - - <u>Number</u> - - -			<u>Percent</u>
Leave trees	100	6.9	24	3.5 ± 1.3	147 - 315	36
Treated trees	100	6.9	967	126 ± 26	10,000-15,100	20

The only live larvae found during the survey were the wood borers. The effect cacodylic acid had on brood development of the other species is unknown. Most of the ips attacks occurred above the point where the acid was injected into the tree while the red turpentine attacks occurred near the ground, well below the injection point. All the mountain pine beetle and the western pine beetle attacks also occurred below the points of injection.

Based upon the evidence of emergence holes in the leave trees, all the attacks had been successful.

CONCLUSION

Chemically thinned stands will attract a variety of secondary bark beetles, particularly ips, and wood borers. This is the same condition usually found in stands that have been thinned with a saw. We believe most of the beetles came in from the surrounding vicinity and not from within the treatment area. It appears the leave trees were attacked at the same time the beetles attacked the chemically treated trees. Since only a few leave trees were attacked, the effect on the degree of stocking was insignificant. Any beetles emerging from the chemically thinned trees or from the infested leave trees apparently flew to fresh slash outside the thinning project.

Attachment

CACODYLIC ACID THINNING PLOTS
ENTIAT DISTRICT
WENATCHEE NATIONAL FOREST

